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| 09/915,024 | 07/25/2001 | Raymond R. Husted | 01AB067 | 7026 |

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| 7590         02/24/2004 | EXAMINER |
| Alexander M. Gerasimow | SONG, JASMINE |

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| ART UNIT | PAPER NUMBER |
|---|---|
| 2188 | |

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *01 December 2003*.

2a)☒ This action is **FINAL**.       2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is

   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-19* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage

      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

## Detailed Action

1.     This office action is in response to Amendment A, mailed 12/01/2003, paper #5.

Claims 1-19 are still pending. All rejections and objections not explicitly repeated below

are withdrawn.


## Specification

2.     The lengthy specification has not been checked to the extent necessary to

determine the presence of all possible minor errors.  Applicant's cooperation is

requested in correcting any errors of which applicant may become aware in the

specification.


## Claim Rejections - 35 USC § 103

3.     The rejection of claims 1-19 under 35 U.S.C. 103(a) as being unpatentable are

maintained and updated as shown below.


4.     The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

5.      Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Schmidt et al., U.S. Patent 5,212,631, in view of Sharma et al., U.S. Patent 6,085,263.

Regarding claims 1,6 and 9, Schmidt teaches that a programmable control

system, comprising:

a processor (Fig.2, General purpose processor 60) for executing a control

program (col.3, lines 63-66 and col.4, lines 33-34); a shared memory  (Fig.2, shared

system RAM 36) storing data associated with the control program, at least one of data

associated with sensing and actuating devices (col.3, lines 63 –68; col.5, lines 58-62

and Fig.3, col.5, lines 32-39), and forced I/O values (Fig.3); and

an I/O processor (Fig.2 or Fig.4, the ladder logic processor 50) for performing at

least one of input and output functions (Fig.4), the I/O processor and the processor

operatively coupled to the shared memory (Fig.2). The I/O processor storing input

values in the shared memory and determining output value based at least in part upon

forced I/O values (utilizing the infrequently changed data) stored in the shared memory

(col.6, lines 50 to col.7, lines 39).

Schmidt does not teach that the I/O processor operatively coupled to a cache

memory storing at least a portion of the forced I/O values stored in the shared memory,

therefore, storing input values in the shared memory and determining output value

based at least in part upon forced I/O values stored in the cache memory.

However, Sharma teaches that the I/O processor operatively coupled to a cache

memory storing at least a portion of the forced I/O values stored in the shared memory

(as shown in Fig.1, IOP 800 includes the cache 820 storing the data prefetched from the

shared memory 150, therefore, storing the data in the shared memory and determining

output value are based on the prefetched data within the cache memory) (col.14, lines

9-37).

It would have been obvious to the ordinary skill in the art at the time the invention

was made to utilize the teachings of Sharma such as having a cache storing the

portion of data from the shared memory because this feature improves overall

performance of the system (col14, lines 38-47) since the prefetched data is already in

the cache memory and does not need to be retrieved from the slow shared memory.

According, one of ordinary skill in the art would have recognized this and

concluded that they are from the same field of endeavor (for example: I/O processor

includes the cache memory). This would have motivated one of ordinary skill in the art

to implement the above combination for the advantages set forth above.


Regarding claims 10,12,15-17 and 19, Schmidt teaches that a method for forcing

an I/O values in an industrial control environment, comprising:

receiving information associated with an input from a sensing device; retrieving

information associated with an output to an actuating device (col.3, lines 63 –68; col.5,

lines 58-62 and Fig.3, col.5, lines 32-39);

Schmidt does not teach that loading a cache with forcing information associated

with a forced input or output and forcing the input or output based at least in part upon

the forcing information loaded in the cache.

However, Sharma teaches that the I/O processor operatively coupled to a cache memory storing at least a portion of the forced I/O values stored in the shared memory (as shown in Fig.1, IOP 800 includes the cache 820 storing the data prefetched from the shared memory 150, therefore, storing the data in the shared memory and determining output value are based on the prefetched data within the cache memory) (col.14, lines 9-37).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Sharma such as having a cache storing the portion of data from the shared memory because this feature improves overall performance of the system (col14, lines 38-47) since the prefetched data is already in the cache memory and does not need to be retrieved from the slow shared memory.

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor (for example: I/O processor includes the cache memory). This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claims 2-3,8,11,13-14 and 18, Sharma teaches that the processor sending a message to the I/O processor in the event a forced I/O value (the infrequently changed data) has been altered during execution of the control program, the I/O processor causing the cache memory to be refreshed by performing a blocked write in response to receipt of the message. It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Sharma

such as I/O processor perform a blocked write to refresh the cache memory in

response to the altered I/O value caused by the processor in order to maintain the

consistency among the caches of the IOP and processors (col.7, lines 10-39).

Regarding claim 4, Schmidt teaches that the forced I/O values comprising at

least one of binary and analog values (col.6, lines 19-21).

Regarding claim 5, Schmidt teaches that the processor and I/O processing being

coupled by at least one of a serial communications backplane bus, a parallel

communications backplane bus and a network (Fig.2, first and second network

interfaces and col.4, lines 1-4).

Regarding claim 7, Schmidt teaches that the infrequently changed data being at

least one of I/O force data, configuration data, I/O fail safe information, a connection

table, an output keep alive table and information associated with an input time-out

(Fig.3).

## Response to Arguments

6.      Applicant's arguments filed 12/01/2003 have been fully considered but they are

not persuasive.

In response to applicant's argument that neither Schmidt or Sharma teach or

suggest the claimed invention "the I/O processor operatively coupled to a cache

memory storing at least a portion of the forced I/O values stored in the shared memory,

the I/O processor both stores input values in the shared memory based at least in part

upon forced I/O values stored in the cache memory, as well as utilizing in part the

forced I/O values stored in cache memory to determine output values", however, it is

noted that the above limitations are taught by Schmidt and Sharma, please refer to the

103(a) rejections as shown above.  Further, applicant must discuss the references

applied against the claims (specifically, the claimed language), explaining how the

claims or claim language avoid the references or distinguish from them, however, the

arguments on page 8-9 have only generic statement regarding the reference without

specifically addressing the points set-forth in the examiner's rejection.

In response to applicant's argument that the examiner's conclusion of

obviousness is based upon improper hindsight reasoning, it must be recognized that

any judgment on obviousness is in a sense necessarily a reconstruction based upon

hindsight reasoning.  But so long as it takes into account only knowledge which was

within the level of ordinary skill at the time the claimed invention was made, and does

not include knowledge gleaned only from the applicant's disclosure, such a

reconstruction is proper.  See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA

1971).

In response to applicant's argument that there is no suggestion to combine the

references, the examiner recognizes that obviousness can only be established by

combining or modifying the teachings of the prior art to produce the claimed invention

where there is some teaching, suggestion, or motivation to do so found either in the

references themselves or in the knowledge generally available to one of ordinary skill

in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re*

*Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the combination

of Schmidt and Sharma teaches the claimed invention and it would have been obvious

to the ordinary skill in the art at the time the invention was made to utilize the teachings

of Sharma such as having a cache storing the portion of data from the shared memory

because this feature improves overall performance of the system (col14, lines 38-47)

since the prefetched data is already in the cache memory and does not need to be

retrieved from the slow shared memory. According, one of ordinary skill in the art would

have recognized this and concluded that they are from the same field of endeavor (for

example: I/O processor includes the cache memory). This would have motivated one of

ordinary skill in the art to implement the above combination for the advantages set forth

above.

## Conclusion

7.     **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action.  In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

8.     When responding to the office action, Applicant is advised to clearly point out the

patentable novelty which he or she thinks the claims present in view of the state of the

art disclosed by the references cited or the objections made. He or she must also show

how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

9.     When responding to the office action, Applicants are advised to provide the

examiner with the line numbers and page numbers in the application and/or references

cited to assist examiner to locate the appropriate paragraphs.

10.    Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jasmine Song whose telephone number is 703-305-

7701.  The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mano Padmanabhan can be reached on 703-306-2903.  The fax phone

numbers for the organization where this application or proceeding is assigned are 703-

872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song                                      Mano Padmanabhan

Patent Examiner                                   Supervisory Patent Examiner

February 19, 2004                                 Technology Center 2100